

L Number	Hits	Search Text	DB	Time stamp
1	1280	transistor and (print adj head)	USPAT; US-PGPUB	2004/03/29 16:12
2	750	((transistor and (print adj head)) and (gate) and @ad<220020118	USPAT; US-PGPUB	2004/03/29 16:15
3	616	((transistor and (print adj head)) and (gate) and @ad<220020118) not (hewlett adj packard)	USPAT; US-PGPUB	2004/03/29 16:00
4	219	((transistor and (print adj head)) and (gate) and @ad<220020118) not (hewlett adj packard)) and source and drain	USPAT; US-PGPUB	2004/03/29 16:14
5	13	((transistor and (print adj head)) and (gate) and @ad<220020118) not (hewlett adj packard)) and (exposing with substrate)	USPAT; US-PGPUB	2004/03/29 16:05
6	7103	transistor and (exposing with substrate)	USPAT; US-PGPUB	2004/03/29 16:09
7	33	(transistor and (exposing with substrate)) and (print adj head)	USPAT; US-PGPUB	2004/03/29 16:09
8	1050	transistor and (exposing with substrate)	EPO; JPO; DERWENT; IBM_TDB	2004/03/29 16:09
9	0	(transistor and (exposing with substrate)) and (print adj head)	EPO; JPO; DERWENT; IBM_TDB	2004/03/29 16:10
10	8	((transistor and (print adj head)) and (gate) and @ad<220020118) not (hewlett adj packard)) and (exposing same etching same substrate)	USPAT; US-PGPUB	2004/03/29 16:14
11	72	(transistor and (print adj head)) and (deposited with oxide) and @ad<220020118	USPAT; US-PGPUB	2004/03/29 16:15

L Number	Hits	Search Text	DB	Time stamp
1	39	(print with head) and (firing with chamber)	EPO; JPO; DERWENT; IBM_TDB	2004/03/29 13:15
2	348	(print with head) and (firing with chamber)	USPAT; US-PGPUB	2004/03/29 13:08
3	73	((print with head) and (firing with chamber)) and (gate or electrode)	USPAT; US-PGPUB	2004/03/29 13:13
4	60	((print with head) and (firing with chamber)) and (gate or electrode)) and @ad<20020118	USPAT; US-PGPUB	2004/03/29 13:14
5	67	((print with head) and (firing with chamber)) and transistor	USPAT; US-PGPUB	2004/03/29 13:14
6	56	((print with head) and (firing with chamber)) and transistor) and @ad<20020118	USPAT; US-PGPUB	2004/03/29 13:16
7	25	((print with head) and (firing with chamber)) and transistor) and @ad<20020118) not (((print with head) and (firing with chamber)) and (gate or electrode)) and @ad<20020118)	USPAT; US-PGPUB	2004/03/29 13:14
8	6	transistor and (firing with chamber)	EPO; JPO; DERWENT; IBM_TDB	2004/03/29 13:15
9	309	transistor and (firing with chamber)	USPAT; US-PGPUB	2004/03/29 13:55
10	267	(transistor and (firing with chamber)) and @ad<20020118	USPAT; US-PGPUB	2004/03/29 13:55
11	236	((transistor and (firing with chamber)) and @ad<20020118) not (((print with head) and (firing with chamber)) and (gate or electrode)) and @ad<20020118)	USPAT; US-PGPUB	2004/03/29 13:16
12	211	((transistor and (firing with chamber)) and @ad<20020118) not (((print with head) and (firing with chamber)) and (gate or electrode)) and @ad<20020118)) not (((print with head) and (firing with chamber)) and transistor) and @ad<20020118) not (((print with head) and (firing with chamber)) and (gate or electrode)) and @ad<20020118))	USPAT; US-PGPUB	2004/03/29 13:54
13	1	("5854307").PN.	USPAT; US-PGPUB	2004/03/29 13:54
14	12	(second adj transistor) and (firing with chamber)	USPAT; US-PGPUB	2004/03/29 13:56
15	12	((second adj transistor) and (firing with chamber)) and @ad<20020118	USPAT; US-PGPUB	2004/03/29 13:56
16	4	(second adj transistor) and (firing adj chamber)	USPAT; US-PGPUB	2004/03/29 13:56
17	4	((second adj transistor) and (firing adj chamber)) and @ad<20020118	USPAT; US-PGPUB	2004/03/29 13:56

L Number	Hits	Search Text	DB	Time stamp
1	4	((("6344663") or ("6485132") or ("6200862") or ("20030081070"))).PN.	USPAT; US-PGPUB	2004/03/29 11:06
2	3442	thermal with ink with jet with head	USPAT; US-PGPUB	2004/03/29 11:24
3	229	(thermal with ink with jet with head) and (transistor or fet) and chamber	USPAT; US-PGPUB	2004/03/29 11:24
4	195	((thermal with ink with jet with head) and (transistor or fet) and chamber) and @ad<20020118	USPAT; US-PGPUB	2004/03/29 11:24
5	212	(ink with jet with head) and (firing with chamber)	USPAT; US-PGPUB	2004/03/29 11:47
6	38	((ink with jet with head) and (firing with chamber)) and (transistor or fet) and chamber	USPAT; US-PGPUB	2004/03/29 11:24
7	31	((((ink with jet with head) and (firing with chamber)) and (transistor or fet) and chamber) and @ad<20020118	USPAT; US-PGPUB	2004/03/29 11:24
8	27	(ink with jet with head) and (firing with chamber)	EPO; JPO; DERWENT; IBM TDB	2004/03/29 11:47

US-PAT-NO: 6318846

DOCUMENT-IDENTIFIER: US 6318846 B1

See image for Certificate of Correction

TITLE: Redundant input signal paths for an
inkjet print head

----- KWIC -----

Application Filing Date - AD (1):

19990830

Brief Summary Text - BSTX (6):

Ink drop ejection through a nozzle employed in a thermal inkjet printer is accomplished by quickly heating the volume of ink residing within the ink

firing chamber with a selectively energizing electrical pulse to a heater

resistor ink ejector positioned in the ink firing chamber.

At the commencement

of the heat energy output from the heater resistor, an ink vapor bubble

nucleates at sites on the surface of the heater resistor or its protective

layers. The rapid expansion of the ink vapor bubble forces the liquid ink

through the nozzle. Once the electrical pulse ends and an ink drop is ejected,

the ink firing chamber refills with ink from the ink channel and ink reservoir.

Detailed Description Text - DETX (6):

FIG. 3 shows an isometric view of the top of a substrate 313 on which is

formed a barrier layer 315 that is shaped to direct ink to flow through a

passage 307 into an ink firing chamber 301. At the

"bottom" of the ink firing

chamber 301 is a thin film heater resistor 309 that is covered by a protective

dielectric layer (not shown). When current is forced through the heater resistor 309, ink in the firing chamber 301 is boiled causing the ink to be expelled through an orifice 303 in the orifice plate or top plate 305 that is placed over the barrier layer 315. By capillary action, ink is retained in the firing chamber 301 until electrical current to the heater resistor heats the ink. The electrical current through the heater resistor therefore determines when ink is ejected from the orifice 303.

Detailed Description Text - DETX (29):

A single example of an ink drop generator found within a print head is illustrated in the magnified isometric cross section of FIG. 3. As depicted, the drop generator comprises a nozzle, a firing chamber, and an ink ejector. Alternative embodiments of a drop generator employ more than one coordinated nozzle, firing chamber, and/or ink ejectors. The drop generator is fluidically coupled to a source of ink.

Detailed Description Text - DETX (30):

In FIG. 3, the preferred embodiment of an ink firing chamber 301 is shown in correspondence with a nozzle 303 and a segmented heater resistor or firing resistor 309. Many independent nozzles are typically arranged in a predetermined pattern on the orifice plate 305 so that the ink drops are expelled in a controlled pattern. Generally, the medium is maintained in a position which is parallel to the plane of the external surface of the orifice plate. The heater resistors are selected for activation in a process that involves the data input from an external computer or other data source coupled to the printer in association with the drop firing controller 215 and power

supply 217. Ink is supplied to the firing chamber 301 via opening 307 to replenish ink that has been expelled from orifice 303 following the creation of an ink vapor bubble by heat energy released from the segmented heater resistor 309. The ink firing chamber 301 is bounded by walls created by the orifice plate 305, a layered semiconductor substrate 313, and barrier layer 315. In a preferred embodiment, fluid ink stored in a reservoir of the cartridge housing flows by capillary force to fill the firing chamber 301.

Claims Text - CLTX (16):

12. The ink jet print head of claim 1 wherein a first transistor in said first set of current-controlling transistors and a second transistor in said second set of current controlling transistors are fired substantially simultaneously.

Claims Text - CLTX (17):

13. The ink jet print head of claim 1 wherein a first transistor in said first set of current-controlling transistors and a second transistor in said second set of current controlling transistors are fired sequentially.